CPU-Based Object Recognition System utilizing AVX
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**Image recognition on small devices**
The ability to detect multiple objects in an image requires large amounts of CPU and GPU usage. In many cases this is not scalable to smaller devices. Smaller devices are limited to low power usage due to battery constraints. Our image recognition process is runnable on small form-factors with lower power usage.

**System Configuration details**

**Algorithms:**
- HOG (histogram of oriented gradients) + SVM For Recognition/Training

**Libraries:**
- Dlib (training and recognition)
- OpenCV (converting images into MAT objects)

**Hardware and OS:**
- Intel Phablet App running Android OS - 5.1.1 on the Intel Atom® x5/x7 Z8000 processor (code name Cherry Trail)

**Example: Bounding Box detection of a Pen**

We have developed an Android smartphone application to train and detect image objects. This app recognizes multiple objects and is able to train for recognition on embedded devices using parallel programming features like AVX/SIMD.

**SVM for image detection**
Deep Learning utilizes the GPU to perform complex calculations that the CPU is unable to perform optimally. While this method is more accurate and many times the answer to the problem, sometimes it is not needed. Our solution utilizes Support Vector Machines (SVM) rather than Deep Learning, therefore CPU is required instead of GPU, allowing scalability to other, smaller platforms.

**Example: Bounding Box detection of road signs**

~80ms/frame for detection